STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION

HAPPY CAMP HARDWOODS

ROAD PLAN

SECTIONS 17 & 20, TOWNSHIP 11 NORTH, RANGE 03 EAST, W.M.
LEWIS COUNTY

LEWIS DISTRICT

AGREEMENT NO.: 30-077532 CONTRACT ADMINISTRATOR: Meg Wallmow

DATE: 09/01/05 STAFF ENGINEER: Ron Geisler

DRAWN & COMPILED BY: Alicia Compton

SECTION 0 – SCOPE OF PROJECT

This project includes but is not limited to optional construction including:

clearing;
grubbing;
right-of-way debris disposal;
excavation and/or embankment to subgrade;
acquisition and installation of drainage structures;
acquisition, manufacture, and application of rock;
grass seeding.

This project also includes but is not limited to reconstruction including:

brushing right-of-way;
clearing existing excavation and embankment slopes;
grubbing existing excavation and embankment slopes;
right-of-way debris disposal;
pulling ditches;
cleaning ditches;
acquisition and installation of additional drainage structures;
grading and shaping existing road surface and turnouts;
spot rocking.

This project also includes but is not limited to pre-haul maintenance including:

pulling ditches;
cleaning ditches;
installing erosion control materials and sediment removal structures;
grading and shaping existing road surface and turnouts;
spot rocking.

This project also includes but is not limited to abandonment including:

Light abandonment.

SECTION 1 - GENERAL CLAUSES

1.1-1

Clauses in this plan apply to all construction, reconstruction, pre-haul maintenance or abandonment including landings unless otherwise noted.

1.1-2

Reconstruction and pre-haul maintenance of the following roads is required. All roads shall be reconstructed or pre-haul maintained on the State's location and in accordance with this Road Plan.

Road	Stations	Type
W-543	0+00 to 29+60	Pre-haul maintenance
W-559	0+00 to 19+41	Reconstruction

1.1-3

Construction of the following road is not required. Roads used by the Purchaser shall be constructed on the State's location and in accordance with this Road Plan.

Road	Stations	Type
W-543A	0+00 to 4+10	Construction

1.1-4

If the Purchaser desires a road location or design change, a revised Road Plan shall be submitted to the State for consideration.

1.1-5

On this plan quantities are minimum acceptable values. Additional quantities required by the State because of hidden conditions or Purchaser's choice of construction season or techniques shall be at the Purchaser's expense. Hidden conditions include, but are not limited to: solid subsurface rock, subsurface springs, saturated ground, and unstable soil.

1.1-10

Abandonment of the following road is required. All roads shall be abandoned in accordance with this Road Plan.

Road	Stations	Type
W-543A	0+00 to 4+10	Light

1.2-1

The construction or abandonment or pre-haul maintenance of any roads specified herein shall not be permitted between September 30 and May 1 unless authority to do so is granted, in writing, by the Contract Administrator.

1.2-2

Purchaser shall not use roads constructed or pre-haul maintained under this Road Plan for hauling, other than timber cut on the right-of-way, without written approval from the Contract Administrator.

1.2-6

Pioneering shall not extend past construction that will be completed during the current construction season. Drainage shall be provided on all uncompleted construction as approved, in writing, by the Contract Administrator.

Clearing and grubbing shall be completed prior to starting excavation and embankment.

Culvert placement in live streams shall precede embankment where culverts are to be placed along natural ground.

Culverts shall be installed in completed subgrade as construction progresses.

Subgrade, ditches, and culvert installations shall be completed and are subject to written approval by the Contract Administrator prior to rock application and/or timber haul.

1.3-2

Roads are intended for dry weather use. Hauling shall be suspended when wheel track rutting exceeds 6 inches unless Purchaser elects to correct the situation at his/her own expense. Corrective measures and continued operations are subject to written approval by the Contract Administrator.

1.4-3

Reference points (R.P.'s) that are moved or damaged at any time during construction shall be reset in their original locations by the Purchaser. Excavation and embankment shall not proceed on road segments controlled by said R.P.'s until all moved or damaged R.P.'s are reset.

1.5-1

Maintenance on roads listed in Contract Clauses C-50 (Purchaser Road Maintenance and Repair) and C-60 (Designated Road Maintainer) shall be performed in accordance with Forest Access Road Maintenance Specifications.

1.5-3

Snowplowing shall not be permitted unless authorized, in writing, by the Contract Administrator.

SECTION 2 - CLEARING

2.1-1

Fell all vegetative material larger than 2 inches DBH or over 5 feet high between the marked right-of-way boundaries or if not marked in the field, between clearing limits specified on TYPICAL SECTION SHEET.

SECTION 3 - GRUBBING

3-1

All stumps shall be removed that fall between grubbing limits shown on the TYPICAL SECTION SHEET.

3-2

Grubbing limits are defined as the entire area between the external limits shown on the TYPICAL SECTION SHEET.

3-5

Organic material shall be excluded from the road subgrade width as shown in TYPICAL SECTION SHEET.

SECTION 4 - DEBRIS DISPOSAL AND REMOVAL

4.1-1

Right-of-way debris is defined as all nonmerchantable vegetative material larger than one cubic foot in volume within the grubbing limits.

4.1-2

All right-of-way debris disposal shall be completed prior to the application of rock and/or timber haul.

4.2.3-1

Right-of-way debris shall be scattered outside the grubbing clearing limits of the road.

4.2.3-2

Right-of-way debris shall not be placed against standing timber.

4.3-1

On the following road, vegetative material including limbs up to 3 inches in diameter shall be cut and removed to 5 feet beyond the back of the ditch and 5 feet beyond the outer edge of the subgrade and to a height of 14 feet above the road surface as shown on the BRUSHING SECTION DETAIL. Vegetative material shall be cut as near flush with the ground as possible, but shall not extend more than 3 inches above the ground.

Road	Stations
W-559	0+00 to 19+41

SECTION 5 - EXCAVATION

5.1-1

Roads shall be constructed or reconstructed in accordance with dimensions shown on the TYPICAL SECTION SHEET.

5.1-2

Purchaser shall not bury merchantable material.

5.1-3

Road grade and alignment shall conform to the State's marked location. Grade and alignment shall have smooth continuity without abrupt changes in direction. Maximum grades are 18 percent favorable and 12 percent adverse. Minimum radius curve is 60 feet.

5.1-4

Minimum extra widening on the inside of curves shall be:

5 feet extra	80 to 100 foot radius curve
7 feet extra	60 to 80 foot radius curve

5.1-5

Curve widening, where required, shall be added to the inside of curves.

5.1-7

Roads shall be constructed or reconstructed to the dimensions shown on the TYPICAL SECTION SHEET, within the tolerance listed below. Tolerance classes for each road are listed on the TYPICAL SECTION SHEET.

Tolerance Class	A	B	C
Road Width (feet)	+1.5	+1.5	+2.0
Subgrade elevation (feet +/-)	0.5	1.0	2.0
Centerline alignment (feet lt./rt.)	1.0	1.5	3.0

5.1-8

Excavation slopes shall be constructed no steeper than shown on the following table:

Material Type	Excavation Slope Ratio
Common Earth (on side slopes of 55%)	1:1
Common Earth (55% to 70% sideslopes)	¾:1
Common Earth (on slopes over 70%)	½:1
Fractured or loose rock	½:1
Hardpan or solid rock	¼:1

5.1-9

Excavation and embankment slopes shall be constructed to a uniform line and left rough for easier revegetation.

5.1-11

Embankment slopes shall be constructed no steeper than shown on the following table:

Material Type	Embankment Slope Ratio
Common Earth and Rounded Gravel	1½:1
Angular Rock	1¼:1
Sandy Soils	2:1

5.1-12

Organic material shall be excluded from the road subgrade.

5.1-18

Turnarounds shall be no larger than 30 feet long and 30 feet wide. Location shall be subject to written approval of the Contract Administrator.

5.1-20

On the following road, Purchaser shall construct ditches and reconstruct excavation slopes to provide sufficient width for ditches and road surface. Excavated slopes shall be consistent with Clause 5.1-8. Excavated material shall be pushed or end hauled to a designated waste area.

Road	Stations	Waste Area Location
W-559	0+00 to 19+41	North side of W-500/W-559 Intersection

5.1.1-1

Waste material shall not be deposited within 50 feet of a cross drain culvert installation.

5.1.1-2

Waste material shall not be deposited within 100 feet of a live stream.

5.1.1-3

Waste material may be deposited adjacent to the road prism on side slopes up to 45 percent if the waste material is compacted and more than 100 feet away from live streams. On side slopes of 45 percent or more, all excavation shall be end hauled or pushed to designated embankment sites.

5.1.1-5

When constructing landings, waste material and embankment shall not be placed on side slopes steeper than 45%.

5.1.1-8

The amount of material to be contained in a waste area shall be at the discretion of the Contract Administrator.

5.2-1

Road pioneering operations shall not undercut the final cut slope, deposit excavated material outside the grubbing limits, or restrict drainage.

5.3-1

All embankment and waste material shall be compacted. The minimum acceptable compaction is achieved by placing embankments in 2 foot or shallower lifts and routing excavation equipment over entire width of the lifts.

5.4-1

Silt-bearing runoff shall not be permitted to go into streams.

5.4-2

Accomplish sediment removal through silt traps, silt fences, settling ponds, or other methods as approved, in writing, by the Contract Administrator.

5.4-3.1

On the following roads, Purchaser shall furnish and evenly spread the seed mixture listed below on all exposed soil inside the grubbing limits at a rate of 40 pounds per acre. The date of application is subject to approval by the Contract Administrator.

Mixture Percent by Weight	Minimum Percent Germination
50% Fescue, Red	90% Germination
25% Ryegrass, Perennial	90% Germination
15% Bentgrass	85% Germination
10% Clover, White and White Dutch (inoculated)	90% Germination

Weed seed shall not exceed 0.5% by weight.

Seed shall be furnished in standard containers on which the following shall be shown:

1. Common name of seed
2. Net weight
3. Percent of purity
4. Percentage of germination
5. Percentage of weed seed and inert material

Required seed not spread by the termination of this contract shall become property of the State.

Road	Stations	Seed Quantity (lbs)
W-543A	0+00 to 4+10	10

5.5-5

Finished subgrade shall be crowned as shown on the TYPICAL SECTION SHEET, and shall be uniform, firm, rut-free, and shaped to ensure surface runoff in an even, unconcentrated manner.

SECTION 6 - DRAINAGE

6.1-2

On the following road, berms shall be removed from shoulders to permit escape of runoff.

Road	Stations
W-559	0+00 to 19+41

6.2.1-1

Purchaser shall furnish, install, and maintain corrugated polyethylene pipe (AASHTO specification No. M-294 Type S) as designated on the CULVERT LIST. Culvert and flume lengths shall be varied to fit as-built conditions subject to written approval by the Contract Administrator.

6.2.1-2

Manufacturer's approved connectors shall be used for corrugated polyethylene pipe.

6.2.1-5

On required roads: culverts, downspouts, flumes, bands, and gaskets as listed on the CULVERT LIST which are not installed shall become property of the State.

6.2.2.1-1

Culvert, downspout, flume, and energy dissipator installation shall be in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL and the Corrugated Polyethylene Pipe Association “Recommended Installation Practices for Corrugated Polyethylene Pipe and Fittings.”

6.2.2.3-1

Cross drains and surface culverts on road grades in excess of 3% shall be skewed at least 30 degrees from perpendicular to the road centerline, except that cross drain culverts at the low points of dips in roads shall not be skewed.

6.2.2.3-2

Cross drain culverts shall be installed at a slope steeper than the incoming ditch grade, but not less than 3% nor more than 10%.

6.2.2.5-1

Drainage structure outfalls shall not terminate directly on unprotected soil that will erode. Downspouts, flumes, and energy dissipators shall be installed to prevent erosion.

6.2.2.5-2

Downspouts and flumes shall be staked on both sides at maximum intervals of 10 feet with 6 foot heavy duty steel posts, and fastened securely to the posts with No. 10 galvanized smooth wire or 2 inch bolts in accordance with CULVERT AND DRAINAGE SPECIFICATIONS DETAIL.

6.3-1

Ditches shall be constructed concurrently with construction of the subgrade. Ditches shall drain to culverts, ditchouts, and natural drainages.

6.3-2

On the following roads, constructing and cleaning the ditchline, culvert headwalls, and catch basins and outlets shall be completed prior to timber haul and shall be done in accordance with the TYPICAL SECTION SHEET and CULVERT AND DRAINAGE SPECIFICATION DETAIL.

Road	Stations
W-543	0+00 to 29+60
W-559	0+00 to 19+41

6.4-1

Settling ponds shall be constructed to resist erosion in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL. Minimum dimensions: two feet wide, two feet deep and four feet long with backslopes consistent with Clause 5.1-8: Excavation Slopes.

6.5-1

Headwalls shall be constructed in accordance with CULVERT AND DRAINAGE SPECIFICATION DETAIL on all culvert inlets where either the stream gradient above the crossing is greater than 6% or where the road has a gradient greater than 6%.

6.6-1

Should the following road not be surfaced with optional rock ballast, the road will be blocked with 20 cubic yards of riprap rock between September 30 and May 1 to prevent vehicle traffic.

Road	Stations
W-543A	0+00 to 4+10

SECTION 7 - ROCK

7.1-1

Rock for construction and/or reconstruction under this contract may be obtained from a source on State land as listed below at no charge to the Purchaser. Development and use shall be in accordance with a written "Development Plan" prepared by the State. A copy of the written plan is attached. Upon completion of operations, the rock source shall be left in the condition specified in said plan, subject to approval by the Contract Administrator. Use of material from any other source must have prior written approval from the Contract Administrator. If other operators are using or desire to use this rock source, a joint operating plan shall be developed. All parties shall follow this plan.

Source	Location
W-500 Pit	SW1/4 Sec. 14, T11N, R03E

7.1-6

Rock for construction, reconstruction and pre-haul maintenance under this contract may be obtained from any commercial source as approved in writing by the Contract Administrator.

7.2.1-4

Rock shall meet the following specifications for gradation. The exact point of evaluation for conformance to specifications will be determined by the Contract Administrator.

7.2.1.1-8

4 INCH IN PLACE rock shall have a minimum of 90 percent of the top 4 inches of the running surface pass a 4 inch square opening. In place processing such as grid rolling, jaw crushing, or other such method as demonstrated by the Purchaser to be effective, shall be required if necessary to achieve this requirement.

7.2.1.1-10

8 INCH PLUS ROCK

% equal to, or larger in one dimension than the specified size	
	100%

All percentages are by weight.

7.2.1.2-2

Pit run rock shall contain no more than 5 percent by weight of vegetative debris, dirt, or trash. Pit run rock will meet the following specifications for rock gradation when placed on the subgrade: No more than 10% of the rock shall be larger than 8 inches in any dimension and no rock shall be larger than 12 inches in any dimension.

7.2.4-1

Rock drilling and shooting shall meet the following specifications:

a. Oversize material remaining in the rock source at the conclusion of the timber sale shall not exceed 5 percent of the total volume mined for the sale.

b. Oversize material is defined as rock fragments larger than two feet in any dimension.

7.4.2-1

Apply at least the minimum required rock depth as shown on the ROCK LIST. Volumes listed are estimates and may vary to meet specified rock depths. Required and optional rock shall meet the specifications on the ROCK LIST.

7.4.2-4

On the following road, if hauling shall take place only from May 1 to September 30, Purchaser may not be required to place or provide the optional rock in the ROCK LIST. Purchaser shall then be required to submit a written plan for approval by the Contract Administrator describing how these roads shall be constructed, used, and abandoned in compliance with all other clauses in the ROAD PLAN.

Road	Stations
W-543A	0+00 to 4+10

7.4.2-5

Subgrade shall be approved, in writing, by the Contract Administrator prior to application of rock.

7.4.2-6

On the following road, a grader shall be used to shape the existing surface prior to timber haul.

Road	Stations
W-559	0+00 to 19+41

7.4.2-9

Turnarounds, turnouts, and curve widening shall have rock applied to the same depth and specifications as the traveled way.

7.4.2-11

On the following roads, Purchaser shall spot patch and apply rock as directed by the Contract Administrator in accordance with quantities shown on ROCK LIST. Rock may be obtained from a designated stockpile indicated on the attached W-500 Pit Development Plan.

Road	Stations
W-543	18+10
W-543	27+15
W-543	28+95
W-559	2+00 to 2+36
W-559	3+00
W-559	7+28
W-559	14+00
W-559	16+90
W-559	19+41

7.4.3-3

Rock shall be spread and compacted using loaded haul trucks concurrently with rock hauling operations.

SECTION 9 - ROAD AND LANDING DEACTIVATION

9.2-1

Purchaser shall reduce or relocate landing debris, in a manner approved, in writing, by the Contract Administrator, to avoid landing failures and potential debris slides.

9.2-2

Purchaser shall provide for drainage of the landing surface as approved, in writing, by the Contract Administrator.

9.2-3

Landing embankments shall be sloped to original construction specifications.

SECTION 10 - ROAD AND LANDING ABANDONMENT

10.1-1

The following road shall be abandoned by the Purchaser prior to the termination of this contract and according to the ROAD ABANDONMENT CROSS SECTIONS DETAIL

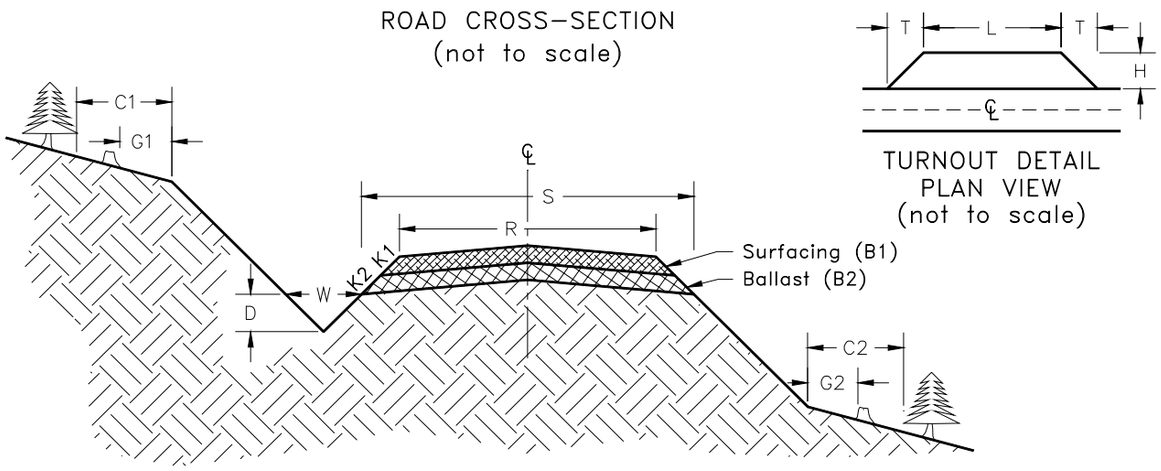
Road	Stations	Type
W-543A	0+00 to 4+10	Light

10.1-3

Light Abandonment shall consist of:

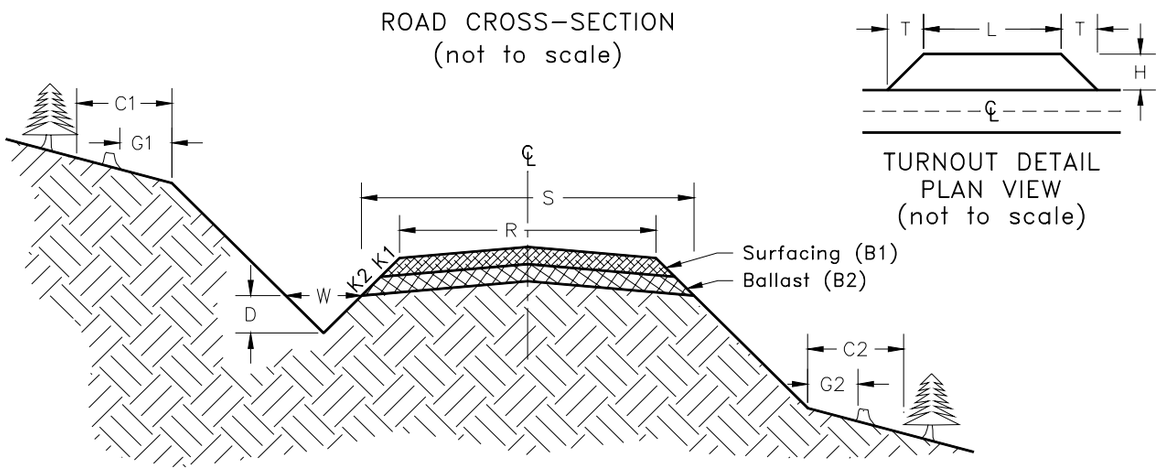
work shall be performed between June 1 and September 30;
constructing non-drivable water bars, as directed by Contract Administrator, in conformance with the attached NON-DRIVABLE WATER BAR DETAIL at a maximum spacing of 100 feet;
keying water bars into ditchline;
skewing water bars at least 30 degrees from perpendicular to the road centerline on roads in excess of 3% grade;
ripping the surface to a minimum depth of 10 inches;
removing ditch cross drain culverts and leaving the resulting trench open;
removing culverts from State Land;
sloping all trench walls and approach embankments no steeper than 1.5:1;
scatter woody debris onto abandoned road surfaces;
construction of tank trap barrier in conformance with the attached "T" TANK TRAP DETAIL;
grass seeding concurrently with abandonment and in accordance with Clause: 5.4-3.1.

TYPICAL SECTION SHEET



Road Number	From Station	To Station	Tolerance Class	Subgrade Width	Road Width	Ditch		Crown in. @ CL	Grubbing Limits		Clearing Limits	
						Width	Depth					
				S	R	W	D		G1	G2	C1	C2
W-543	0+00	29+60	C	16’	12’	3’	1’	4”	0’	0’	10’	10’
W-543A	0+00	4+10	C	16’	12’	2’	1’	4”	1’	1’	5’	5’
W-559	0+00	19+41	C	16’	12’	3’	1’	4”	0’	0’	10’	10’

ROCK LIST



BALLAST

Road Number	From Station	To Station	Rock Slope	Compacted Rock Depth	C.Y./ Station	# of Stations	C.Y. Subtotal	Rock Source	Turnout Length	Turnout Width	Turnout Taper
			K2	B2	PIT RUN				L	H	T
W-543A (Optional rock)	0+00	4+10	1-1/2	15”	81	4.1	332	W-500			
						8” PLUS					
		Culvert Headwalls/Energy Dissipators					3				

OPTIONAL PIT RUN TOTAL: 332 Cubic Yards
8 INCH PLUS TOTAL: 3 Cubic Yards

SURFACE

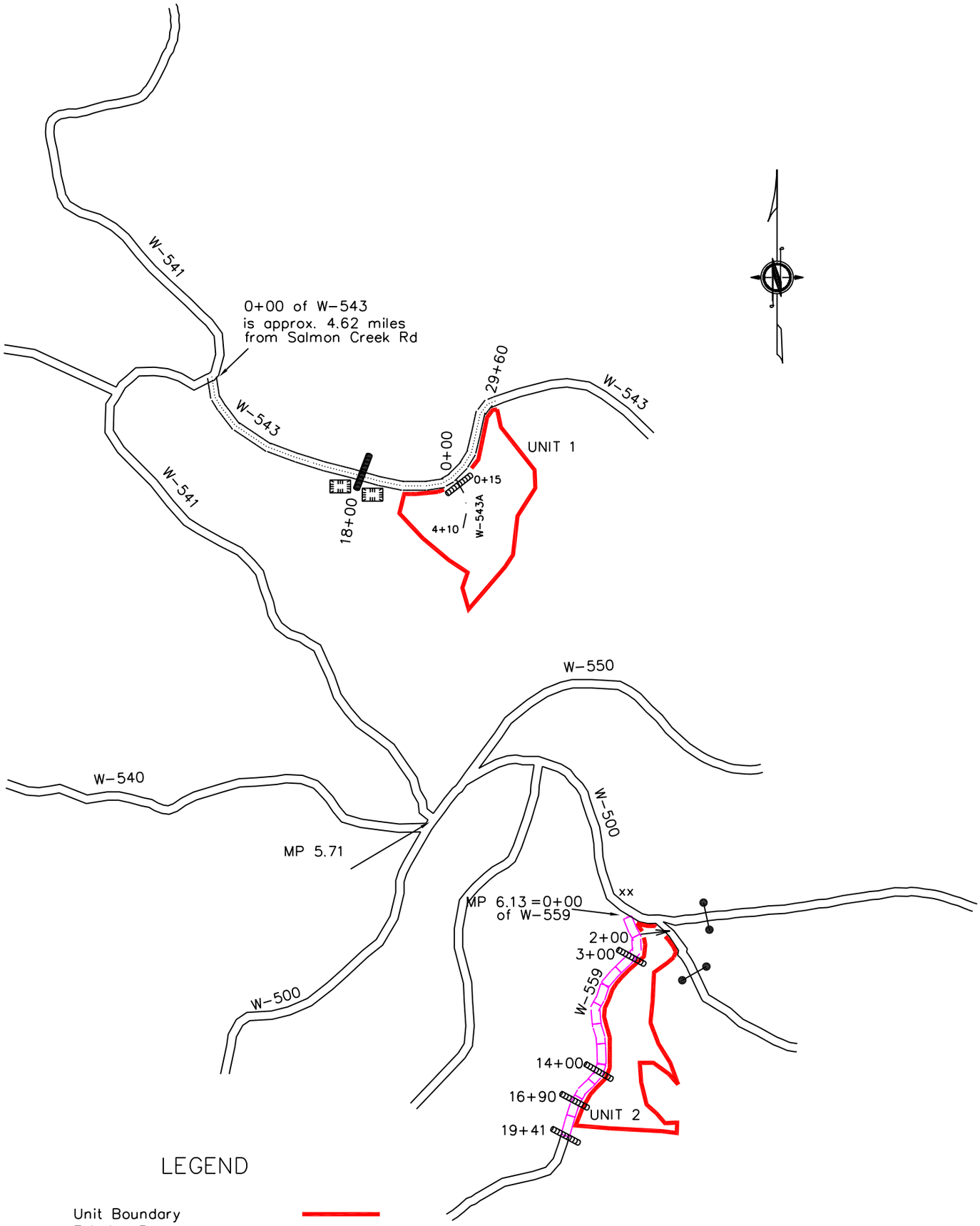
Road Number	From Station	To Station	Rock Slope	Compacted Rock Depth	C.Y./ Station	# of Stations	C.Y. Total	Rock Source
			K1	B1	4 INCH IN PLACE			
W-543	18+10	18+10	1-1/2	-	-	-	10	W-500 Designated Stockpile
W-543	27+15	27+15	1-1/2	-	-	-	10	
W-543	28+95	28+95	1-1/2	-	-	-	10	
W-559	2+00	2+36	1-1/2	-	-	-	20	
W-559	3+00	3+00	1-1/2	-	-	-	10	
W-559	7+28	7+28	1-1/2	-	-	-	10	
W-559	14+00	14+00	1-1/2	-	-	-	10	
W-559	16+90	16+90	1-1/2	-	-	-	10	
W-559	19+41	19+41	1-1/2	-	-	-	10	

4 INCH IN PLACE TOTAL: 100 Cubic Yards

If Purchaser elects to haul on optional rock roads in dry weather, the depth listed above is recommended but not required.

HAPPY CAMP HARDWOODS

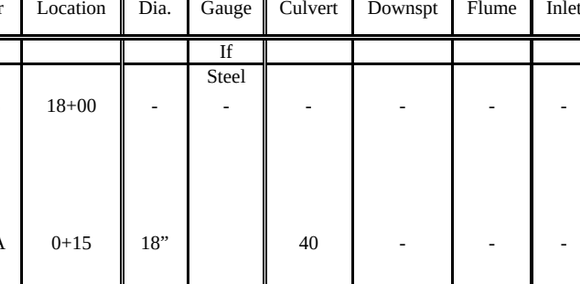
ROAD PLAN MAP



CULVERT LIST

Road Number	Location	Culvert Dia.	Culvert Gauge If Steel	Length (ft) Culvert	Length (ft) Downspt	Length (ft) Flume	Riprap (C.Y.) Inlet	Riprap (C.Y.) Outlet	Riprap (C.Y.) Type	Backfill Material	Placement Method	Const. Staked	Remarks
W-543	18+00	-	-	-	-	-	-	-	-	-	-	-	Existing culvert. Install Settling Ponds in ditchline on each side.
W-543A	0+15	18”		40	-	-	-	-	-	NT	-	-	Install culvert in ditchline.
W-559	2+00	-	-	-	-	-	-	-	-	-	-	-	Ditchout Left
	3+00	18”	-	30	-	-	-	0.5	8”+	NT	-	-	Cross Drain
	14+00	18”	-	30	-	20’	-	0.5	8”+	NT	-	-	Cross Drain in low spot
	16+90	18”	-	30	-	-	0.5	0.5	8”+	NT	-	-	T5 stream
	19+41	18”	-	30	-	20’	-	0.5	8”+	NT	-	-	Cross Drain in low spot

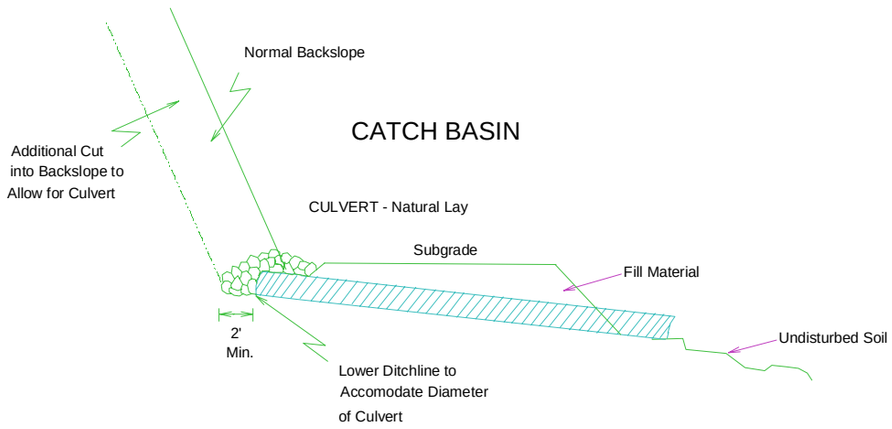
CULVERT BACKFILL AND BASE PREPARATION
(For culverts less than 36")

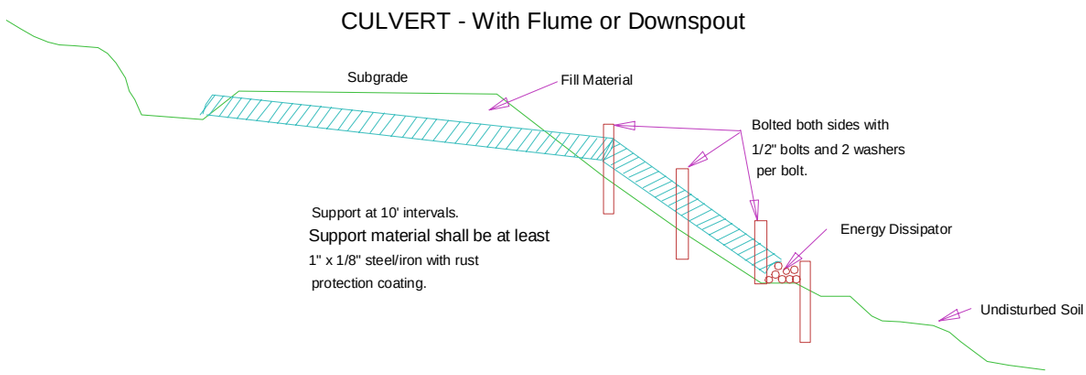


Key:

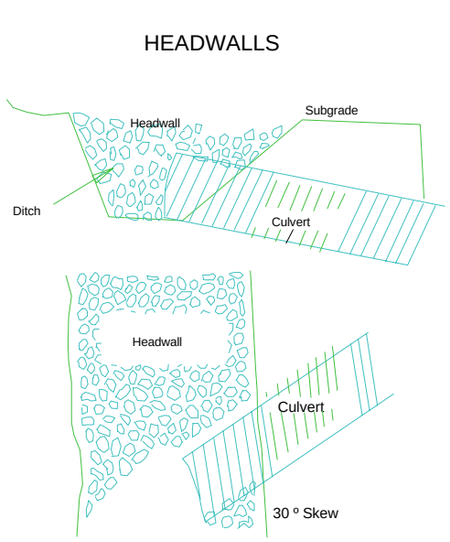
SR - Shot Rock
NT - Native (bank run)
SL - Select Fill
HL - Heavy Loose Riprap
LL - Light Loose Riprap
8”+ - Per 7.2.1.1-10
Flume - Half round pipe
Downspout - Full round pipe

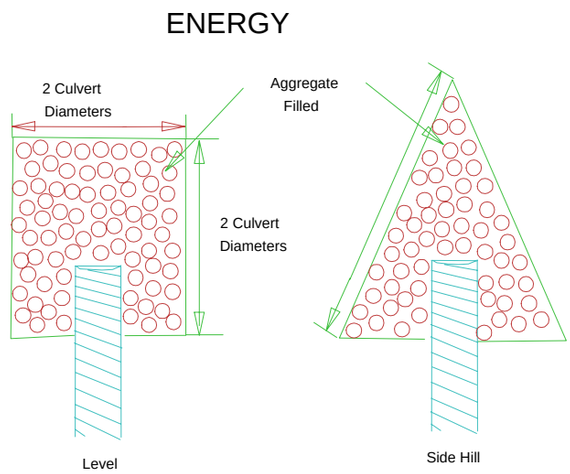
CULVERT AND DRAINAGE SPECIFICATION DETAIL





Proper preparation of foundation and placement of bedding material shall precede the installation of all culvert pipe. This includes necessary leveling of the native trench bottom and compaction of required bedding material to form a uniform dense unyielding base. The backfill material shall be placed so that the pipe is uniformly supported along the barrel.





Headwalls to be constructed of material that will resist erosion.

Dissipator Specifications:
Depth: 1 culvert diameter
Aggregate: as specified in the CULVERT LIST.

CULVERT AND DRAINAGE SPECIFICATION DETAIL

(Page 2 of 2)

POLYETHYLENE PIPE INSTALLATION

INSTALLATION REQUIREMENTS:

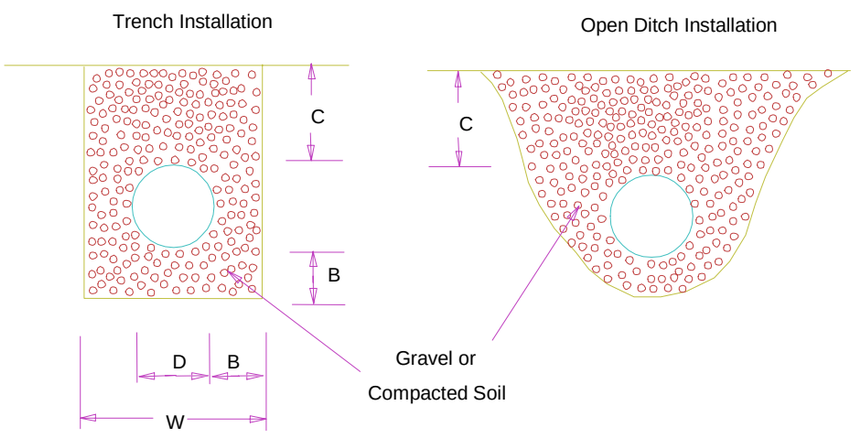
1. Crushed stone, gravel, or compacted soil backfill material shall be used as the bedding and envelope material around the culvert. The aggregate size shall not exceed 1/6 pipe diameter or 4" diameter, whichever is smaller.

2. The corrugated pipe shall be laid on grade, on a layer of bedding material as shown for the two types of installations. If native soil is used as the bedding and backfill material, it shall be well compacted in six inch layers under the haunches, around the sides and above the pipe to the recommended minimum height of cover.

3. Either crushed aggregate or flexible (asphalt) pavement may be laid as part of the minimum cover requirements.

4. Site conditions and availability of bedding materials often dictate the type of installation method used.

5. The load bearing capability of flexible conduits is dependent on the type of backfill material used and the degree of compaction achieved. Crushed stone and gravel backfill materials typically reach a compaction level of 90-95% AASHTO standard density without compaction. When native soils are used as backfill material, a compaction level of 85% of that material is required. This minimum compaction can be achieved by either hand or mechanical tamping. Purchaser shall test the compaction level and bare all associated costs.



MINIMUM DIMENSIONS
Trench or Open Ditch Installation

Nominal Diameter	Minimum Thickness	Minimum Cover	Min. Trench Width
D	B	C	W
18"	6"	12"	36"
24"	6"	12"	42"
30"	6"	12"	48"
36"	6"	12"	54"

STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES

FOREST ACCESS ROAD
MAINTENANCE SPECIFICATIONS

1. CONSTRUCTION AND RECONSTRUCTION (Prior to acceptance to the contract or acceptance on a timber sale).

A. Cuts and Fills
   1. Maintain slope lines as constructed. Remove slides from the ditches and roadway. Replace fills to 12:1 slopes with selected material or as directed. Remove overhanging material from the cut slopes.
   2. Material from slides or other sources requiring removal shall not be deposited in streams or at locations where it will erode into streams or water courses.
   3. Undesirable slide materials and debris shall not be mixed into the surface material.

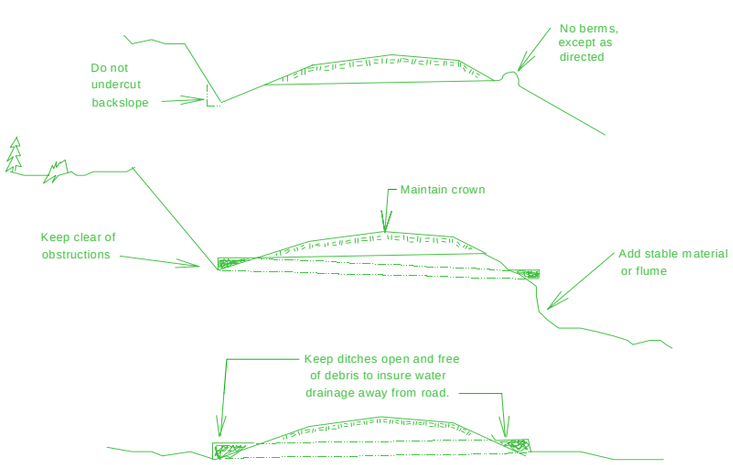
B. Surface
   1. Grade and shape the road surface, turnouts, and shoulders to the original crown, inslope or outslope as directed to provide suitable traveled surface and surface water runoff in an even, unconcentrated manner.
   2. Blading must not undercut the backslope at the bottom of the ditchline or cut geotextile at centerline.
   3. Watering may be required to control dust and to retain fine surface rock.
   4. Desirable surface material shall not be bladed off the roadway.
   5. Replace surface material lost or worn away.
   6. Remove berms except as directed by the State.
   7. Barrel spread soft spots to prevent degradation of geotextile.

C. Drainage
   1. Keep ditches and drainage channels at outlets and inlets of culverts clear of obstructions and functioning as intended.
   2. Inspect and clean culverts at least monthly, with additional inspections during storms and periods of high runoff. This must be done even during periods of inactivity.
   3. Add stable material at the outlet end of the culvert as needed to stabilize the stream bed.
   4. Headwalls: maintain to the road shoulder level with material that will resist erosion.
   5. Keep silt bearing surface runoff from getting into live streams.

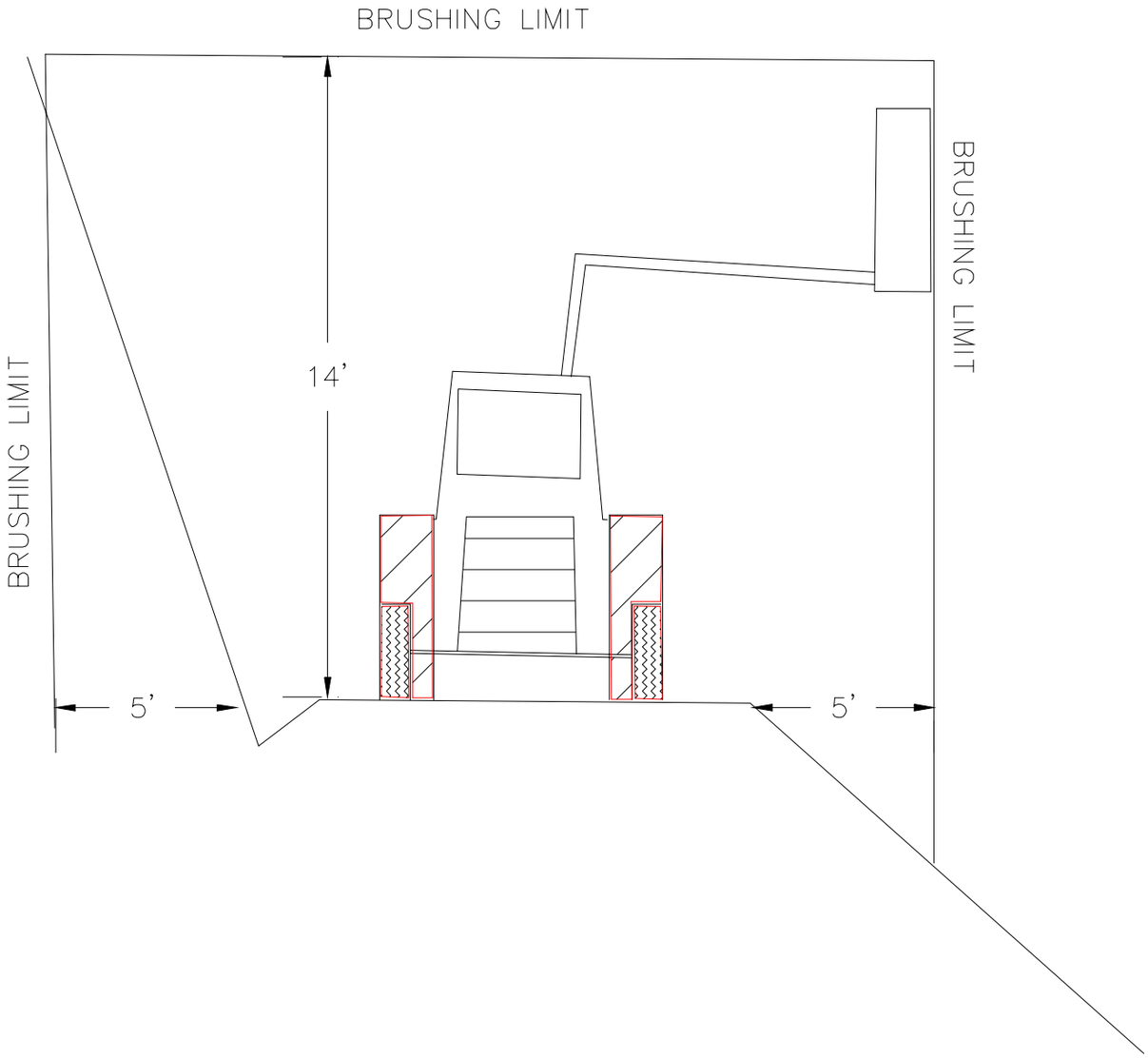
D. Structures
   Repair bridges, culverts, cattleguards, fences, and other road structures to the condition required by the construction specifications.

E. Termination of Use or End of Season
   Do maintenance work to minimize damage from the elements such as blading to insure correct runoff, ditch, and culvert cleaning and water bars.

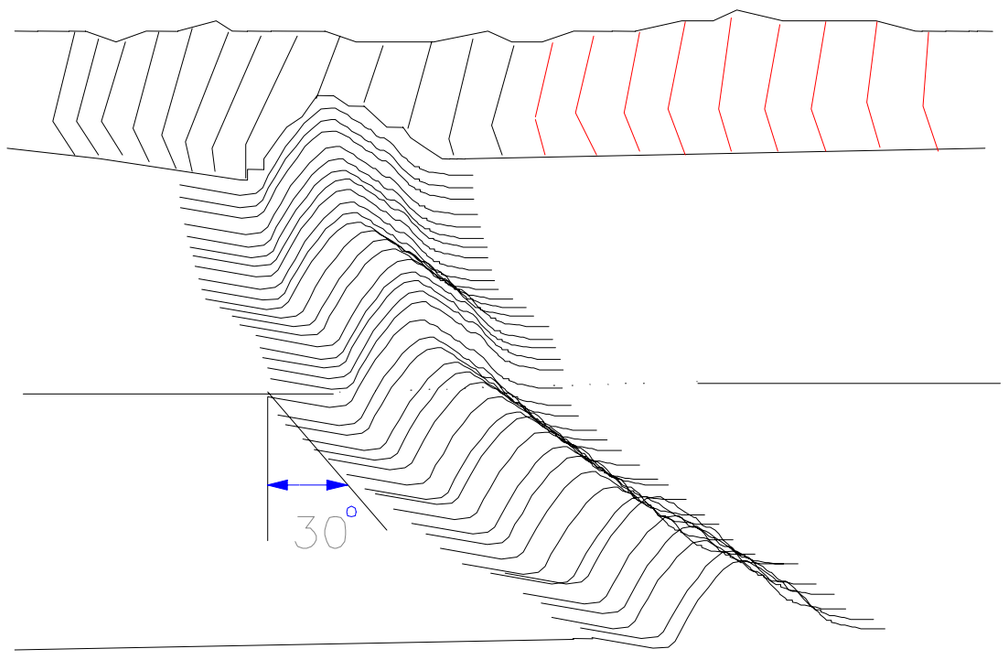
F. Debris
   Remove fallen timber, limbs, and stumps from the slopes or roadway.

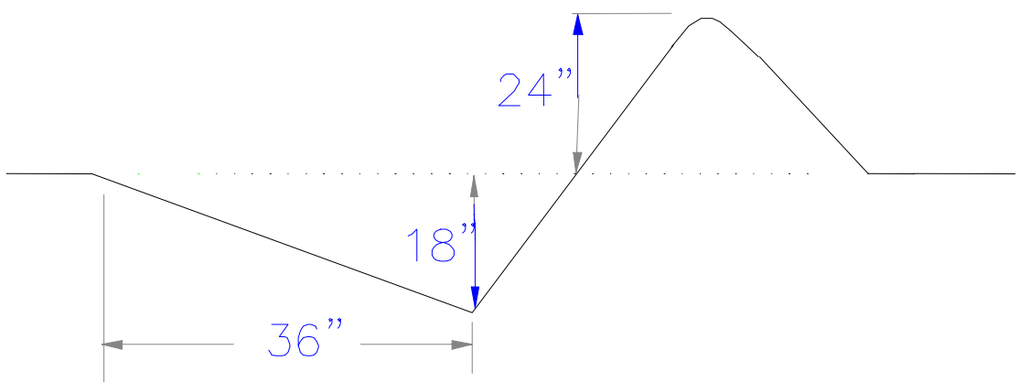


BRUSHING SECTION DETAIL

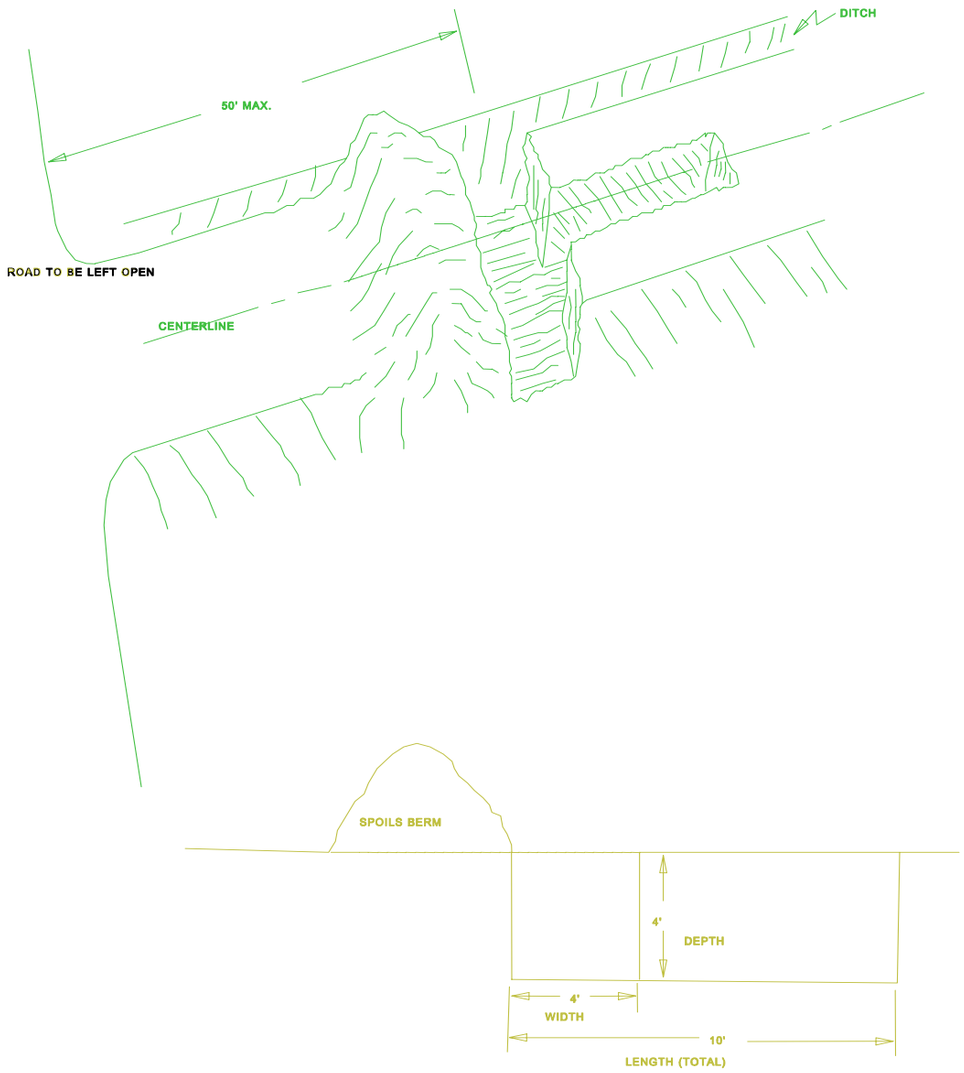


NON-DRIVABLE WATER BAR DETAIL

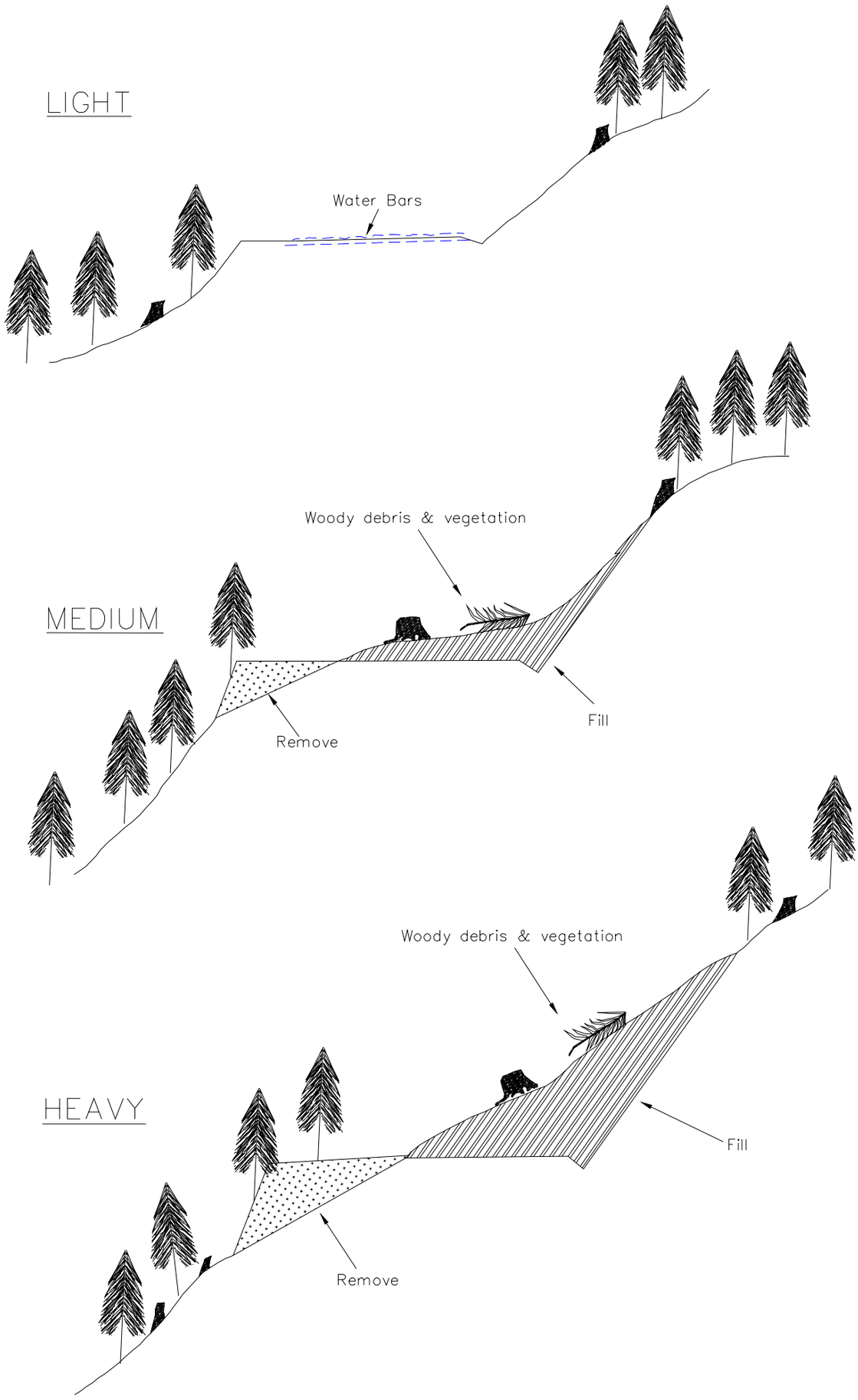




"T" TANK TRAP DETAIL



ROAD ABANDONMENT CROSS SECTIONS



STATE OF WASHINGTON
DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION

W-500 QUARRY NARRATIVE

SW1/4 SECTION 14, TOWNSHIP 11 NORTH, RANGE 03 EAST, W.M.

1. Mining shall begin in the designated development area.

2. The Contractor shall maintain a minimum of 15 foot wide stripped area from the quarry face at all times. Trees shall be cleared to a minimum of ¾ of the height of the tallest tree adjacent to the quarry.

3. Overburden shall be pushed to the designated waste areas and compacted. Minimal acceptable compaction is achieved by placing waste material in 2 foot or shallower lifts and routing excavation equipment over entire width of the lifts.

4. Root wads and organic debris larger than one cubic foot in volume shall be separated from overburden material and piled in the designated waste area.

5. Quarry faces shall not exceed 30 feet in height.

6. Working bench width shall be a minimum of 20 feet.

7. The quarry floor shall have continuity of slope be left in a smooth and neat condition, providing drainage to the northwest at a minimum of 2 percent.

8. Oversize material remaining in the rock source at the conclusion of use shall not exceed 5 percent of the total volume mined during that operation. Oversize material is defined as rock fragments larger than two feet in any direction. At the conclusion of operations, oversize material shall be placed as directed by the Contract Administrator.

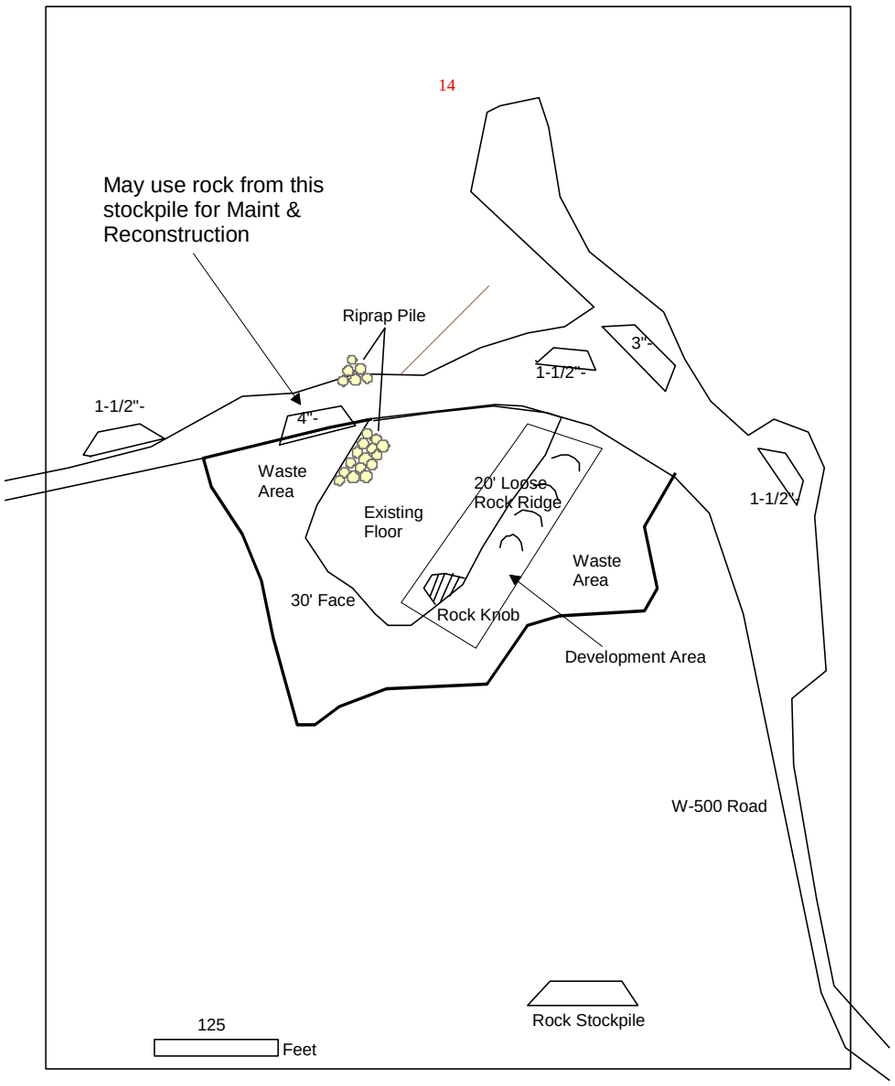
9. At the end of operations, quarry faces and walls shall be scaled and cleared of loose and overhanging material. Upon completion of operations in the pit, the area will be left in a condition that will not endanger public safety, damage property, or be hazardous to animal or human life.

10. Reclamation will not be required following use.

11. All operations shall be carried out in compliance with all regulations of:
    a. “Regulations and Standards Applicable to Metal and Nonmetal Mining and Milling Operations” (30 CFR) U.S. Department of Labor, Mine Safety and Health Administration.
    b. “Safety Standards – Metal and Nonmetallic Mines, Quarries, Pits, and Crushing Operations” (296-61 WAC), Washington Department of Labor and Industries.
    c. “Safety Standards for Construction Work” (296-155 WAC), Washington Department of Labor and Industries.

W-500 Quarry Development Plan

SW1/4 Sec 14, 11-03E



DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION
LEWIS DISTRICT
SUMMARY - ROAD DEVELOPMENT COSTS

SALE/PROJECT NAME: HAPPY CAMP HARDWOODS CONTRACT NUMBER: 30-077532

LEGAL DESCRIPTION: Sec. 17 & 20, T11N R3E

ROAD NUMBER:	W-543A Construction	W-559 Reconstruction	W-543 Pre-Haul Maintenance
ROAD STANDARD:	12'	12'	12'
NUMBER OF STATIONS:	4.10	19.41	29.60
SIDESLOPE:	10-20%	0	0
CLEARING AND GRUBBING:	$400		
EXCAVATION AND FILL:	$631		
MISC. MAINTENANCE:		$3,710	$1,271
ROCK TOTALS (Cu. Yds.):			
Ballast: 332	$2,295	$0	$0
Surface: 100	$0	$387	$209
8"+ 3	$0	$61	$0
CULVERTS AND FLUMES:	$427	$1,286	$0
STRUCTURES:	$0	$0	$0
GENERAL EXPENSES:	$450	$599	$178
MOBILIZATION:	$817	$817	$817
TOTAL COSTS:	$5,020	$6,860	$2,475
COST PER STATION:	$1,224	$353	$84

ROAD DEACTIVATION AND ABANDONMENT COSTS: $1,592

NOTE: This appraisal has no allowance for profit and risk.

TOTAL (All Roads) = $15,946

SALE VOLUME MBF = 1,000

TOTAL COST PER MBF = $15.95

Compiled by: rgg Date: 07/14/05

DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION
LEWIS DISTRICT
ROAD COST ESTIMATE - CONSTRUCTION

SALE NAME: HAPPY CAMP HARDWOODS CONTRACT NUMBER: 30-077532

I. CLEARING AND GRUBBING:

Flat Rate -	% Side Slope	MBF/ac	Disposal Factor	Production Factor	Cost/ Station	Width Factor	Total Stations	Sub Total
W-543A	15	30	1.00	2.44	$40	1.00	4.10	$400

Clear and Grub TOTAL = $400

II. EXCAVATION:

Flat Rate -	% Side Slope	Exc. Type Fact.	Production Factor	Cost/ Station	Width Factor	Total Stations	Sub Total
W-543A	15	1.0	1.75	$88	1.00	4.10	$631

*End Haul, Over Haul, Large Fills/Cuts	Estimated Vol. (cy)	No. of Equip. Days	Cost/day	Sub Total
End Haul/ Over Haul				$0
Large Fills/ Cuts				$0

Excavation TOTAL = $631

III. BALLAST AND SURFACING :

Ballast source: W-500 Pit
Surface source:
Riprap source :

Description	cu.yds/sta	x stations	= cubic yards
Ballast (Pit Run)	81	4.10	332
Surfacing			
Riprap			

UNIT COSTS	Ballast	Surfacing	8" Plus
Drill & Shoot			
Dig and load	$1.00		
Crushing			
Purchase			
Haul *	$3.81	$3.81	$3.81
Spread	$2.00		
Compact	$0.10		
Strip			
Reclamation			
Use tax	$0.00	$0.00	$0.00
TOTAL ($/cy)	$6.91	$3.81	$3.81

* Haul Formula: (R.T.Miles/MPH+Delay)($/hr / Cy/load)

R.T. Miles =	8.9						
Ave. Speed =	20	Ballast (Pit Run)	332	Cu. yds @	$6.91	/cu. yd =	$2,295
Delay (Hrs.)=	0.2	Surfacing	0	Cu. yds @	$3.81	/cu. yd =	$0
Cost / Hour =	$65.00	Riprap	0	Cu. yds @	$3.81	/cu. yd =	$0
CY / Load =	11						

Rock total = $2,295

IV. CULVERTS AND FLUMES:

Description	Qty.	Gauge	Diameter	No/Length	Installed Cost/ft	Sub-total
Poly	1		18	40	$10.50	$420
						$0
						$0
						$0
						$0
Bands & Gaskets	1		18		$6.50	$7

Culvert total = $427

V. STRUCTURES

Description	Type	Width	Length	Cost/ft.	Sub-total
					$0
					$0
					$0

Structure total = $0

Sub-TOTAL = $3,753

VI. GENERAL EXPENSES: Overhead & General Exp. Add 12% $450

VII. MOBILIZATION:

* Move in costs are averaged over all three sheets.

Description	$ per Move	# of Moves	Sub-total
Dump Trucks	100	6	$600
Grader	400	1	$400
Compactor	400	0	$0
Excavator	450	1	$450
Dozer D8)	400	1	$400
Front end loader	400	1	$400
Rock crusher	$1,500	0	$0
Brusher	$200	1	$200
Dozer (D5)	$240	0	$0

Total Mobilization = $2,450 Mobilization sub-total = $817

Road No. W-543A
Standard: 12'
Stations: 4.10

SHEET TOTAL = $5,020

DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION
LEWIS DISTRICT
ROAD COST ESTIMATE -
RECONSTRUCTION COSTS

SALE NAME: HAPPY CAMP HARDWOODS CONTRACT NUMBER: 30-077532

Total stations Reconstruction = 19.41

I. MISC. MAINTENANCE ITEMS:

	Cost/ Station	Total Stations	Sub Total
Mechanical Brushing =	$15.10	19.41	$293
Hand Brushing =			$0
Ditch Cleaning =	$52.00	19.41	$1,009
Grading =	$5.50	19.41	$107
Culve Cleanout =	$30.00	1	$30
Settling Ponds =	$0.00	0	$0
Clearing & Grubbing	$117.00	19	$2,271

Misc TOTAL = $3,710

III. BALLAST AND SURFACING :

Ballast source: W-500 Pit
Surface source:
8" Plus source : W-500 Pit

Description	cu.yds/sta	x stations =	cubic yards
Ballast	0	0.00	0
Surfacing (4"IP)	70	1.00	70
8" Plus	3	1.00	3

UNIT COSTS	Ballast	Surfacing	8" Plus
Drill & Shoot			
Dig and load		$1.00	$3.00
Crushing			
Purchase			
Haul *		$2.43	$2.43
Spread		$2.00	$15.00
Compact		$0.10	
Strip			
Reclamation			
Use tax	$0.00	$0.00	$0.00
TOTAL ($/cy)	$0.00	$5.53	$20.43

* Haul Formula: (R.T.Miles/MPH+Delay)($/hr / Cy/load)

R.T. Miles = 5.3
Ave. Speed = 25
Delay (Hrs.)= 0.2
Cost / Hour = $65.00
CY / Load = 11

Ballast	0	Cu. yds @	$0.00	/cu. yd =	$0
Surfacing (4"IP)	70	Cu. yds @	$5.53	/cu. yd =	$387
8" Plus	3	Cu. yds @	$20.43	/cu. yd =	$61

Rock total = $448

IV. CULVERTS AND FLUMES:

Description	Qty.	Gauge	Diameter (in.)	No/Length (ft)	Installed Cost/ft	Sub-total
Poly	4		18	30	$10.50	$1,260
						$0
						$0
						$0
						$0
Bands & Gaskets	4		18	1	$6.50	$26

Culvert total = $1,286

V. STRUCTURES

Description	Type	Width	Length	Cost/ft.	Sub-total
					$0
					$0
					$0

Structure total = $0

Sub-TOTAL = $5,445

VI. GENERAL EXPENSES: Overhead & General Exp. Add 11% $599

VII. MOBILIZATION:

* Move in costs are averaged over all three sheets.

Description	$ per Move	# of Moves	Sub-total
Dump Trucks	100	4	$600
Grader	400	1	$400
Compactor	400	0	$0
Excavator	450	1	$450
Dozer D8)	400	1	$400
Front end loader	400	1	$400
Brusher	$200	1	$200
Dozer (D5)	$240	0	$0

Total Mobilization = $2,450 Mobilization sub-total = $817

Road No. W-559
Standard: 12'
Stations: 19.41

SHEET TOTAL = $6,860

DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION
LEWIS DISTRICT
ROAD COST ESTIMATE -
PRE-HAUL MAINTENANCE COSTS

SALE NAME: HAPPY CAMP HARDWOODS CONTRACT NUMBER: 30-077532

Total stations Pre-Haul Maintenance = 29.60

I. MISC. MAINTENANCE ITEMS:

	Cost/ Station	Total Stations	Sub Total
Mechanical Brushing =			$0
Hand Brushing =			$0
Ditch Cleaning =	39.00	29.60	$1,154
Grading =			$0
Culver Cleanout =			$0
Settling Ponds =	117	1	$117

Misc TOTAL = $1,271

III. BALLAST AND SURFACING :

Ballast source:
Surface source: W-500 Pit
8" Plus source :

Description	cu.yds/sta	x stations	= cubic yards
Ballast			0
Surfacing (4"IP)	30	1.00	30
8" Plus			0

* Haul Formula: (R.T.Miles/MPH+Delay)($/hr / Cy/load)

UNIT COSTS	Ballast	Surfacing	8" Plus
Drill & Shoot			
Dig and load		$1.00	
Crushing			
Purchase			
Haul *		$3.72	
Spread		$2.15	
Compact		$0.10	
Strip			
Reclamation			
Use tax	$0.00	$0.00	$0.00
TOTAL ($/cy)	$0.00	$6.97	$0.00

R.T. Miles =	8.6						
Ave. Speed =	20	Ballast	0	Cu. yds @	$0.00	/cu. yd =	$0
Delay (Hrs.)=	0.2	Surfacing (4"IP)	30	Cu. yds @	$6.97	/cu. yd =	$209
Cost / Hour =	$65.00	8" Plus	0	Cu. yds @	$0.00	/cu. yd =	$0
CY / Load =	11						

Rock total = $209

IV. CULVERTS AND FLUMES:

Description	Qty.	Gauge	Diameter (in.)	No/Length (ft)	Installed Cost/ft	Sub-total
Poly						$0
						$0
						$0
						$0
						$0
Bands & Gaskets						$0

Culvert total = $0

V. STRUCTURES

Description	Type	Width	Length	Cost/ft.	Sub-total
					$0
					$0
					$0

Structure total = $0

Sub-TOTAL = $1,481

VI. GENERAL EXPENSES: Overhead & General Exp. Add 12% $178

VII. MOBILIZATION:

* Move in costs are averaged over all three sheets.

Description	$ per Move	# of Moves	Sub-total
Dump Trucks	100	4	$600
Grader	400	1	$400
Compactor	400	0	$0
Excavator	450	1	$450
Dozer D8)	400	1	$400
Front end loader	400	1	$400
Brusher	$200	1	$200
Dozer (D5)	$240	0	$0

Total Mobilization = $2,450 Mobilization sub-total = $817

Road No. W-543
Standard: 12'
Stations: 29.60

SHEET TOTAL = $2,475

DEPARTMENT OF NATURAL RESOURCES
PACIFIC CASCADE REGION
LEWIS DISTRICT
ROAD COST ESTIMATE - ROAD DEACTIVATION AND ABANDONMENT

SALE NAME: HAPPY CAMP HARDWOODS CONTRACT NUMBER: 30-077532

Total stations Road Deactivation and Abandonment = 4.10

I. MISC. ROAD CLOSURE COSTS:

	Cost/ Station	Total Stations	Sub Total
water barring =	$46.83	4.10	$192
ripping =	$58.54	4.10	$240
culvert removal =	$38.78	4.10	$159
sidecast pullback =			$0
landing cleanup =			$0
tank trapping =	$28.54	4.10	$117
strawing =			$0
grass seeding =	$18.29	4.10	$75
laborer =	$7.32	4.10	$30
miscellaneous =	$28.54	4.10	$117

Misc TOTAL = $930

Detail:

	Sta	Waterbars	Time/W/B	Total Time	Cost/Hr	Total Cost
Waterbars						
W-555E	4.1	4	0.4	1.64	$117	$192
Subtotal						$192
Rip Surface	4.1		0.5	2.05	$117	$240
Remove cmp's	1		0.25	0.25	$117	$29
Haul cmp's away				2	$65	$130
Subtotal						$159
			sta/hr			
Sidecast Pullback						
Landing Cleanup						
Tank Trap	1		1	1	$117	$117
Straw						
Seed - cost of seed	10 lbs	$1.50/ lb				$15
Seeding Labor				3	$20	$60
Subtotal						$75
Laborer				1	$30	$30
Miscell Cleanup				1	$117	$117

VI. GENERAL EXPENSES: Overhead & General Exp. Add 12% $112

VII. MOBILIZATION:

Description	$ per Move	# of Moves	Sub-total
Dump Trucks	100	1	$100
Grader	400		$0
Compactor	400		$0
Excavator	450	1	$450
Dozer D8)	400		$0
Front end loader	400		$0
Rock crusher	$1,500		$0
Dozer (D5)	$240		$0

* These move in costs are separate since they will occur after logging is done

Total Mobilization = $550

Road No. W-555E
Standard: Road Deactivation and Abandonment
Stations: 4.10

SHEET TOTAL = $1,592